Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

I have been asked to give Brief appraisal of engineering Soviet

~~SECRET~~
SECURITY INFORMATION

SCIENTIFIC AND TECHNICAL MANPOWER [redacted] 25X1A9a
IN THE SOVIET UNION

as a background for your consid of Item 2

INTRODUCTION

- THE USSR HAS TRAINED A LARGE BODY OF SCIENTISTS AND ENGINEERS WHICH IS INCREASING IN SIZE AND IN QUALITY AND IS APPROACHING THAT POSSESSED BY THE UNITED STATES. This growth is the result of:

  a. The Soviets' belief that science and technology are indispensable for the attainment of economic and military goals, and

  b. The autocratic system of Soviets which has permitted them to plan and to enforce nation-wide programs for scientific and technical education.

GENERAL QUALITY

WHILE THE QUALITY OF SOVIET SCIENTIFIC AND TECHNICAL MANPOWER IS UNEVEN IT IS IMPROVING.

a. There remain many poor and mediocre

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

Soviet engineers and scientists because of low standards in science education and research in the early and mid-thirties. (Caused primarily by over-expansion of the scientific effort.)

b. After 1933, standards have risen as a result of:

(1) official measures directed at higher quality,

(2) a gradual "catching up" of the numbers of more adequately prepared graduates of secondary schools to enter colleges and universities.

c. The training of current and recent Soviet graduates from colleges and universities compares well with that of American graduates. (The Soviet student regularly graduates at age 22 after about 15 years of training

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

with a far greater and more consistent emphasis on science, especially in the secondary schools, than in the United States.)

d. Recent Soviet efforts in many fields, both in theory and application, demonstrate a high degree of competence.

QUANTITATIVE MEASURES OF SOVIET SCIENTIFIC-TECHNICAL MANPOWER CAN BE MADE BY COMPARING THE NUMBERS OF PERSONS IN THE USSR AND THE UNITED STATES IN GROUPS OF SIMILAR QUALITY.

a. THE FOLLOWING 2 GROUPS HAVE BEEN CHOSEN:

(1) Graduates of colleges and universities in scientific and technical fields.

(2) Persons holding higher degrees in scientific fields; the Soviet Kandidat and the American PhD (including ScD's.) (In terms of formal

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

requirements, which include 3 or more years of post-graduate study and a thesis, the Kandidat is the near equivalent of the PhD.)

b. BOTH OF THE GROUPS HAVE BEEN BROKEN DOWN ACCORDING TO THE FOLLOWING 3 SUBJECT CATEGORIES:

(1) Physical sciences, including engineering

(2) Agricultural sciences

(3) Health sciences

CHART 1

CHART 1 INDICATES THE FIELDS WHICH ARE INCLUDED IN THESE CATEGORIES.

Not necessary

c. COMPARISONS - CHART 2

(1) CHART 2 SHOWS THAT THE NUMBERS OF GRADUATES EMPLOYED IN THE 3 SUBJECT CATEGORIES IN THE USSR AND THE UNITED STATES ARE COMPARABLE.

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

CHART 3

(2) CHART 3 SHOWS THE PROPORTIONS OF CURRENT 1953 GRADUATES FROM COLLEGES AND UNIVERSITIES IN THE USSR AND THE USA THAT ARE IN SCIENTIFIC AND TECHNICAL FIELDS.

CHART 4

(3) CHART 4: SOVIET AND USA TRENDS (1930-1964) IN NUMBERS GRADUATING EACH YEAR FROM COLLEGES AND UNIVERSITIES IN ALL SCIENTIFIC AND TECHNICAL FIELDS.

a. Note the Soviet increase around 1935 (at considerable cost in quality) and subsequent leveling off.

b. The American peak in 1950 due to the "GI Bill."

c. THE EXTRAPOLATIONS INDICATE THAT THE SOVIET UNION WILL GRADUATE MORE THAN WE. THESE EXTRAPOLATION ARE PROBABLY ACCURATE UP TO '58 BECAUSE OF STUDENTS NOW IN "PIPE LINE."

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

CHART 5

(4) SIMILARLY, CHART 5 SHOWS THAT THE NUMBERS OF SOVIET KANDIDATS AND AMERICAN PhD's IN THE 3 SUBJECT CATEGORIES ARE ROUGHLY COMPARABLE.

(5) IN THE PRECEDING ESTIMATES FOR THE SOVIET UNION, ERRORS ARE BELIEVED TO BE WITHIN TEN PERCENT.

TRENDS IN THE GROWTH OF SCIENTIFIC MANPOWER

CURRENT RATES OF GROWTH OF THE SCIENTIFIC-TECHNICAL MANPOWER GROUPS ARE GREATER IN THE SOVIET UNION THAN IN THE UNITED STATES.

a. From 1918 to the present, the Soviet Union increased its numbers of schools and students ten fold, (from 91 to about 900 institutions and from 112,000 to about 1,100,000 full-time students.)

b. Present Soviet policies call for continued increases

c. Recent rates of enrollment into colleges

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

and universities indicate increasing numbers of graduates from these institutions for at least several more years.

FACTORS IN QUALITY OF SCIENTIFIC - TECHNICAL MANPOWER

THE SOVIET EDUCATIONAL SYSTEM EMPHASIZES SCIENTIFIC SUBJECTS AND PROVIDES FOR THE SELECTION AND SUPPORT OF ABLER STUDENTS.

a. The curricula of secondary schools offer a good foundation for later studies in science.

b. Stress on science in education is apparent in the high percentage of graduates in the scientific fields.

c. Scholastic ability is the main condition for continuing a student's education and stipends are weighted to favor good students.

CONCLUSIONS

Despite obvious uncertainties consistent emphasis by the USSR during recent years on

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

scientific and technical strength make the following conclusions reasonable:

a. THE SIZE OF SOVIET SCIENTIFIC AND TECHNICAL MANPOWER IS SIMILAR TO THAT OF THE US, AND IS INCREASING AT A GREATER RATE.

b. IF PRESENT TRENDS CONTINUE, THE TOTAL CAPABILITIES OF SOVIET SCIENTIFIC AND TECHNICAL MANPOWER (support material effort) MAY WELL EXCEED THOSE OF THE UNITED STATES WITHIN THE NEAR FUTURE.

The above trend toward an unfavorable balance could only be altered by a major increase in emphases on scientific and technical training in the US or by an unexpected radical de-emphasis (or) such training by the USSR.

No likelihood of the latter and China showing signs of following suit

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

FURTHER PERTINENT COMMENTS ON

THE SUBJECT OF MANPOWER

A. Examples of the areas in which the Soviets have recently done outstanding work include nuclear research; electronics, particularly in telecommunications, radar, and navigation systems; and in jet aircraft development.

B. An important factor in favor of US is the general high level of technical capabilities of our population.

C. Soviets are pushing interest in model aircraft and amateur radio among the civil population to develop technical skills.

D. Even though, ~~undoubtedly~~, at the present time US has considerable advantage in total capabilities of manpower, much of our best scientific talent is devoted to research and engineering of consumer goods, ranging from better air conditioning to

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5

color television, whereas nearly all of Soviet manpower is devoted to strengthening industry as a mobilization base and to improving military weapons.

Doctrinaire problem - True
Biological sciences -

Not True in Physics
Chemistry
Engineering

General liberalization thruout Soviet Intellectual world. Sakharov death penalty
Kapitza - top fellow in
Hydrogen bomb - Oxford Don
believed.
Once exiled now back

Can give them so much
help

Approved For Release 1999/09/08 : CIA-RDP80R01443R000100380006-5